

Appendix A

Marked- Up Version of Paragraph at Page 21, lines 8-11

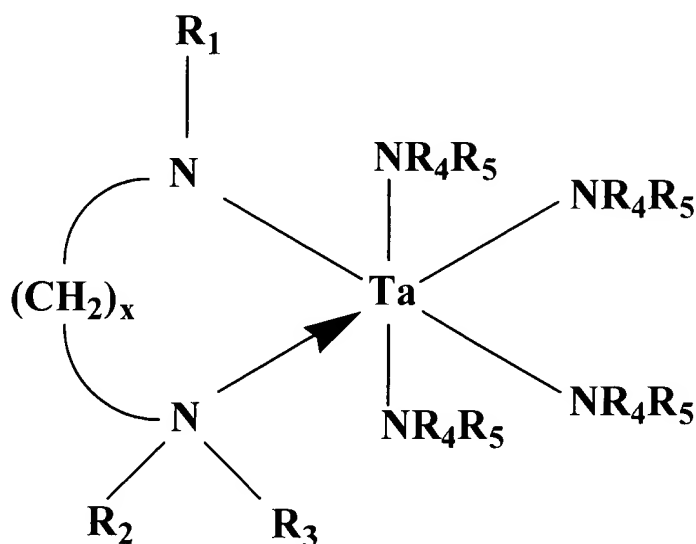
The aforementioned precursors of the present invention provide Ta source reagents that have beneficial volatility characteristics for applications such as chemical vapor deposition, and are easily and economically synthesized. The Ta source reagents of the invention [utilized] utilize molecular geometries that are controlled by subtle steric effects.

Appendix B

Marked-Up Version of Claims 5 and 6

5. (Amended) A method of forming Ta or Ti material on a substrate from a precursor, comprising vaporizing said precursor to form a precursor vapor, and contacting the precursor vapor with the substrate to form said Ta or Ti material thereon, wherein the precursor comprises at least one tantalum and/or titanium species selected from the group consisting of:

- (i) tethered amine tantalum complexes of the formula:



wherein:

x is the integer 2 or 3;

each of $\text{R}_1\text{-R}_5$ is independently selected from the group consisting of H, $\text{C}_1\text{-C}_4$ alkyl, aryl, C_{1-6} perfluoroalkyl and trimethylsilyl;

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(ii) β -diimines of the formula:



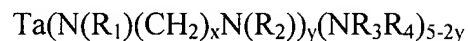
wherein:

G is a β -diimino ligand;

each Q is selected from the group consisting of H, C₁-C₆ alkyl, aryl and C₁₋₆ perfluoroalkyl; and

x is an integer from 1 to 4 inclusive;

(iii) tantalum diamide complexes of the formula



wherein:

x is the integer 1 or 2;

y is the integer 1 or 2;

each of R₁-R₄ is independently selected from the group consisting of H, C₁-C₄ alkyl, aryl, perfluoroalkyl, and trimethylsilyl;

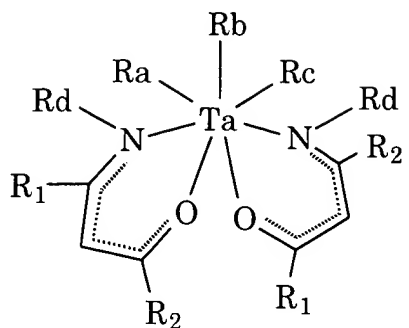
(iv) tantalum amide compounds of the formula



wherein each R and R' is independently selected from the group consisting of H, C₁₋₄ alkyl, phenyl, perfluoroalkyl, and trimethylsilyl, subject to the proviso that in each

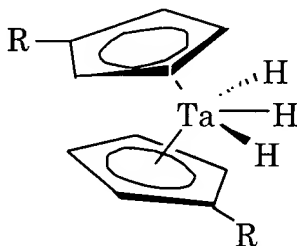
NRR' group, R \neq R';

(v) β -ketoimines of the formula



wherein each of R_1 , R_2 , R_a , R_b , R_c and R_d is independently selected from H, aryl, C_1 - C_6 alkyl, and C_1 - C_6 perfluoroalkyl; and

(vi) tantalum cyclopentadienyl compounds of the formula



wherein each R is [independently selected from the group consisting of H, methyl, ethyl, isopropyl, t-butyl, and] trimethylsilyl;

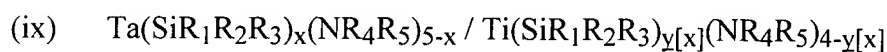
(vii) $Ta(NR_1R_2)_x(NR_3R_4)_{5-x} / Ti(NR_1R_2)_{[x]y}(NR_3R_4)_{4-[x]y}$

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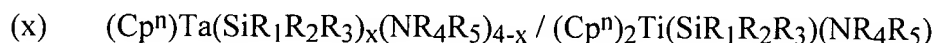
wherein each of R_1 , R_2 , R_3 and R_4 are independently selected from the group consisting of H, C_1 - C_8 alkyl, aryl, C_1 - C_8 perfluoroalkyl or a silicon-containing group selected from the group consisting of silane, alkylsilane, perfluoroalkylsilyl, triarylsilane and alkylsilylsilane, wherein x is an integer from 1 to 5 inclusive; and y is an integer from 1 to 4 inclusive;



wherein each of R_1 , R_2 , and R_3 are independently selected from the group consisting of H, C_1 - C_8 alkyl, aryl, C_1 - C_8 perfluoroalkyl or a silicon-containing group selected from the group consisting of silane, alkylsilane, perfluoroalkylsilyl, triarylsilane and alkylsilylsilane, with the proviso that $R_1 \neq tBu$ and $R_2 \neq R_3 = Et$;



wherein each of R_{1-5} is independently selected from the group consisting of H, Me, Et, tBu , Ph, iPr , CF_3 , SiH_3 , $SiMe_3$, $Si(CF_3)_3$, $Si(Et)_3$, $Si(iPr)_3$, $Si(tBu)_3$, $Si(Ph)_3$, and $Si(SiMe_3)_{z[x]}(Me)_{3-z[x]}$, wherein x is an integer from 1 to 4 inclusive; y is an integer from 1 to 3 inclusive; and z is an integer from 1 to 3 inclusive; and

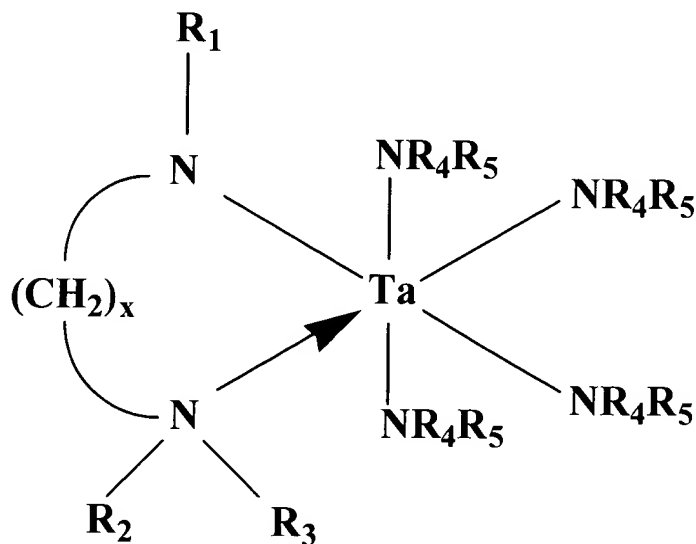


wherein each of R_{1-5} is independently selected from the group consisting of H, Me, Et, tBu , Ph, iPr , CF_3 , SiH_3 , $SiMe_3$, $Si(CF_3)_3$, $Si(Et)_3$, $Si(iPr)_3$, $Si(tBu)_3$, $Si(Ph)_3$, $Si(SiMe_3)_{y[x]}(Me)_{3-y[x]}$ and Cp^n is $C_5H_{z[x]}Me_{(5-z[x])}$, wherein x is an integer from 1 to 3

inclusive; y is an integer from 1 to 3 inclusive; and z is an integer from 0 to 5 inclusive [= 0-5)].

6. (Amended) [A] The method according to claim 5, of forming Ta material
[wherein said material formed] on said [the] substrate [is TaN, and the] , wherein said
precursor is a tantalum species selected from the group consisting of[:] tantalum species
(i), (ii), (iii), (iv), (v) and (vi), and wherein said Ta material is TaN

[(i) tethered amine tantalum complexes of the formula:



wherein:

X is 2 or 3;

each of $\text{R}_1\text{-R}_5$ is independently selected from the group consisting of H, $\text{C}_1\text{-C}_4$ alkyl, aryl, $\text{C}_1\text{-C}_6$ perfluoroalkyl, and trimethylsilyl;

(ii) β -diimines of the formula:



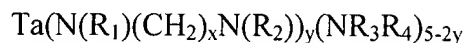
wherein:

G is a β -diimino ligand;

each Q is selected from the group consisting of H, C₁-C₆ alkyl, aryl and C₁-C₆ perfluoroalkyl; and

x is an integer from 1 to 4 inclusive;

(iii) tantalum diamide complexes of the formula



wherein:

x is 1 or 2;

y is 1 or 2;

each of R₁-R₄ is independently selected from the group consisting of H, C₁-C₄ alkyl, aryl, perfluoroalkyl, and trimethylsilyl;

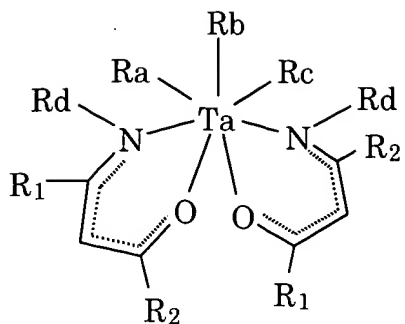
(iv) tantalum amide compounds of the formula



wherein each R and R' is independently selected from the group consisting of H, C₁-C₄ alkyl, phenyl, perfluoroalkyl, and trimethylsilyl, subject to the proviso that in each NRR'

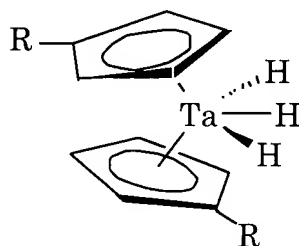
group, $\text{R} \neq \text{R}'$;

(v) β -ketoimines of the formula



wherein each of R₁, R₂, R_a, R_b, R_c and R_d is independently selected from H, aryl, C₁-C₆ alkyl, and C₁-C₆ perfluoroalkyl; and

(vi) tantalum cyclopentadienyl compounds of the formula



wherein each R is independently selected from the group consisting of H, methyl, ethyl, isopropyl, t-butyl, trimethylsilyl].